



Complex Light and Optical Forces IX

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Complex Light and Optical Forces IX

**Enrique J. Galvez
Jesper Glückstad
David L. Andrews**
Editors

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The CID Number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages.

Contents

v	<i>Authors</i>
vii	<i>Conference Committee</i>
ix	<i>Introduction</i>

OPTICAL BEAM SCULPTURING

9379 03	Adaptive self-reconstruction and autocorrelation of nondiffracting wavepackets [9379-2]
9379 05	Spiral phase plates for the generation of high-order Laguerre-Gaussian beams with non-zero radial index [9379-4]

POLARIZATION IN COMPLEX LIGHT

9379 07	Pancharatnam-Berry phase optical elements for generation and control of complex light: generalized superelliptical q-plates (Invited Paper) [9379-6]
9379 08	Complex light fields enter a new dimension: holographic modulation of polarization in addition to amplitude and phase [9379-7]
9379 09	Is Monstar topologically the same as lemon? [9379-8]
9379 0A	Space-variant polarization patterns of non-collinear Poincaré superpositions [9379-10]

QUANTUM COMPLEX LIGHT

9379 0F	Spatially varying polarization singular pattern: degree of coherence [9379-15]
9379 0G	Encoding and decoding non-separable states of polarization and spatial mode of single photons [9379-16]

STRUCTURED LIGHT IN PHOTONICS INSTRUMENTATION: JOINT SESSION WITH CONFERENCES 9369 and 9379

9379 0J	Optical vortex position detection with a Shack-Hartmann wavefront sensor using extended closed contour method [9379-19]
9379 0K	Characterization of OAM carrying beams by means of holographic correlation filters [9379-20]

OPTICAL TWEEZERS

- 9379 OL **Dynamical stabilisation in optical tweezers (Invited Paper)** [9379-21]
- 9379 OM **Real-time dynamic coupling of GPC-enhanced diffraction-limited focal spots** [9379-22]
- 9379 ON **The efficiency of fiber optical tweezers for cell manipulation using distinct fabrication methods** [9379-23]
- 9379 OO **Optimal illumination of phase-only diffractive element using GPC light shaper** [9379-24]

OPTICAL FLOWS

- 9379 OP **Light shaping along 3D curves and particle manipulation (Invited Paper)** [9379-25]
- 9379 OQ **On the viability of achieving chiral separation through the optical manipulation of molecules (Invited Paper)** [9379-29]
- 9379 OR **Evanescent fields of laser written waveguides** [9379-27]

OPTICAL FORCES

- 9379 OU **Nanoassembled dynamic optical waveguides and sensors based on zeolite L nanocontainers** [9379-31]

POSTER SESSION

- 9379 OW **Study of constrained Brownian motion of nanoparticles near an interface using optical tweezers** [9379-32]

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Alieva, Tatiana, 0P	Romanato, F., 05
Alpmann, Christina, 08, 0U	Ruffato, G., 05
Andrews, David L., 0Q	Samlan, C. T., 0F
Bañás, Andrew, 0M, 0O	Santamato, E., 07
Barroso, Álvaro, 0U	Schlickriede, C., 08
Beach, K., 0A	Schulze, Chistian, 0K
Bock, M., 03	Smart, Thomas J., 0L
Bradshaw, David S., 0Q	Soppera, O., 0N
Brüning, Robert, 0K	Studer, Armido, 0U
Brunne, J., 03	Toyoda, Haruyoshi, 0J
Buscher, Tim, 0U	Treffer, A., 03
Carli, M., 05	Trouillon, Raphaël, 0W
Cheng, X., 0G	Viegas, J., 0N
Cornaglia, Matteo, 0W	Villangca, Mark, 0M, 0O
Cubero, David, 0L	Viswanathan, Nirmal K., 09, 0F
Denz, Cornelia, 08, 0U	Wallrabe, U., 03
Dieckmann, Katrin, 0U	Yang, Hui, 0W
Duparré, Michael, 0K	Zeosky, J. J., 0A
Flamm, Daniel, 0K	
Forbes, Andrew, 0K	
Galvez, Enrique J., 0A, 0G	
Gijs, Martin A. M., 0W	
Glückstad, Jesper, 0M, 0O	
Götte, Jörg B., 0R	
Grunwald, R., 03	
Guerreiro, A., 0N	
Huang, Hongxin, 0J	
Inoue, Takashi, 0J	
Jones, Philip H., 0L	
Jorge, P. A. S., 0N	
Jukić, Dario, 0R	
Kebede, K., 0G	
Khajavi, B., 0A, 0G	
König, S., 03	
Kopylov, Oleksii, 0M, 0O	
Kumar, Vijay, 07, 09	
Lehnert, Thomas, 0W	
Luo, Jia, 0J	
Marrucci, Lorenzo, 07	
Massari, M., 05	
Matsui, Yoshinori, 0J	
Otte, E., 08	
Palima, Darwin, 0M, 0O	
Pandey, Rishabh, 0F	
Piccirillo, Bruno, 07	
Pohl, Thomas, 0R	
Richards, Christopher J., 0L	
Rodrigo, José A., 0P	
Rodrigues Ribeiro, R. S., 0N	

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- 1 Optical Beam Sculpturing
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- 2 Polarization in Complex Light
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- 3 Quantum Effects
Wolfgang A. Ertmer, Leibniz Universität Hannover (Germany)
- 4 Quantum Complex Light
Giovanni Milione, The City College of New York (United States)
- 5 Structured Light in Photonics Instrumentation: Joint Session with
Conferences 9369 and 9379
Yakov G. Soskind, DHPC Technologies (United States)
Enrique J. Galvez, Colgate University (United States)
- 6 Optical Tweezers
David L. Andrews, University of East Anglia (United Kingdom)
- 7 Optical Flows
Jörg B. Götte, Max-Planck-Institut für Physik komplexer Systeme
(Germany)
- 8 Optical Forces
Enrique J. Galvez, Colgate University (United States)

Introduction

Complex Light and Optical Forces had its ninth meeting 11–12 February 2015, in San Francisco, California, United States. It was particularly auspicious timing to have a conference on fundamental and applied aspects of light in 2015, designated the International Year of Light. The conference was held in the backdrop of a beautiful city, which enjoyed exceptionally good weather in the days of the conference.

The conference had 33 presentations that included 3 posters. Session titles were “Optical Beam Sculpturing,” “Polarization in Complex Light,” “Quantum Effects,” “Quantum Complex Light,” “Optical Tweezers,” “Optical Flows,” and “Optical Forces.” An additional session on “Structured Light in Photonics Instrumentation” was held jointly with the conference on Photonics Instrumentation Engineering II.

Cementing its unofficial role as the yearly outlet for research on the fundamentals of complex light and optical manipulation, the conference presentations and the papers in this volume reflect the state of the art research in the field. They included new in-depth understanding of complex light fields, in problems such as optical healing and revival, or in the unraveling of the exquisite complexity that is present in space-variant polarization fields. The modes of light also continue to further our understanding of quantum mechanics, and unravel the role of complex light in encoding quantum information for communication and computation. The conference included healthy debates on the classical-quantum boundary. It also highlighted new technological devices that advance the manipulation of phase and polarization of designer beams to yet higher levels of sophistication. This control of light has enabled new ways of facilitating the interaction between light and matter, such as the use of optically manipulated conduits to channel the light and deliver radiation pressure or the spectral content to matter in new ways and from directions not previously accessible. Such unraveling of light complexity has also led to proposals for new forces and interactions between light and matter, which are the seeds for future research.

The contributions in this volume are representative of the latest research in the field, and as presented at the meeting, underscore the vitality of an exciting topic of research and technology that studies and uses light in all of its complexity.

**Enrique J. Galvez
David L. Andrews
Jesper Glückstad**

